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M. FROIDEVAUX'S PARIS LETTER.

PARIS, Sept. 20, 1901.

The *Service Géographique de l'Armée* received in 1887 not only its present name but its organization, of which I propose to say a few words in beginning this letter. Charged, as it is, with all the geodetic, topographic, and cartographic work necessary to the army in time of peace as in war, as well as with the perfecting of the instruments in use, the *Service Géographique* constitutes a department of the Ministry of War, and is divided into five sections, each with its proper functions and its special field. Each one of these sections (Geodesy, Surveys, Topography, Cartography, Accounts) has its responsible head to superintend the execution of the work prescribed by the *Directeur du Service Géographique*, who is at present Gen. Bassot, *sous-chef* of the General Staff of the Army, and member of the Academy of Sciences.

The personnel of the Geodetic section (which is under the *chef d'escadron d'artillerie* Bourgeois) determines the primary chains of triangles for laying down maps, measures arcs of meridian and parallels, and fixes in azimuth, latitude, and longitude the principal points of its triangulations. The measurement of bases, triangulations with their resulting calculations and the observations attached to researches on the forms of the land belong also to this section.

The section of Surveys under M. Romieux, lieutenant-colonel of engineers, performs the topographical work on a large scale, requiring mathematical exactitude.

M. Romieux is also at the head of the section of Topography, which makes surveys on the ground and the new maps, besides keeping up, by means of annual revisions, the map of the General Staff, preparing and executing surveys in Algeria, and establishing maps of foreign countries and the French colonies.

Col. Berthaut, of the infantry, is the head of the section of Cartography, the technical section of the *Service Géographique*. This section reproduces the work of the first three, brings together and groups the results, gives them a definitive form, and publishes them in maps on different scales. A number of officers are busied with French cartography, others with that of foreign countries; and the Section comprises working rooms for drawing, for engraving on

zinc and copper, for photography, heliogravure, electrotyping, and printing.

The section of Accounts regulates the employment of the funds of the *Service Géographique* and attends to the storing and distribution of the maps and to their sale for the Treasury.

In my next letter I shall present a summary of the work done by the *Service Géographique*, as now organized.

The vacation this year has been marked, as always, by the meeting of congresses, of which mention must here be made. The first was the National Congress of French Geographical Societies, held at Nancy in the beginning of August; the twenty-second session of this now well-established institution.

At this Congress, presided over by Vice-Admiral Fournier, several communications of an interesting character were made. M. Fauvel advocated the unification of the conventional signs employed in maps, and uniformity of scale (at least in countries which recognize the metric system), and the respect of the old denominations of localities drawn from an earlier form of the language or from dialect. The Congress expressed its wish that geographers and topographers might agree to adopt a single series of conventional signs, and that all maps should hereafter be constructed on simple scales, the denominators of which should be the factors 1, 2, and 5, and their multiples and sub-multiples. M. B. Auerbach presented a programme of decentralisation, calling for a geographical study of the natural regions of France, to serve as a basis for territorial divisions better adapted to the political and social life. This very delicate question will be brought before the next Congress, which is to meet at Oran in April, 1902.

The meeting of the French Association for the Advancement of Science was held in September at Ajaccio, Corsica, under the presidency of Dr. Hamy. The geographical section, of which Prince Roland Bonaparte is the head, has done a great deal of work; but the most important communications relating to Corsica were presented in other sections.

M. Th. Moureaux studied the distribution of the magnetic elements in the island on the 1st of January, 1896; M. V. Raulin offered his conclusions drawn from the recorded observations of the rainfall in Corsica for the period 1855-1899; M. A. Brive dwelt on the parallelism of the tertiary formations of Corsica and Algeria; and M. Roule, in a paper on the fishes of the Corsican coast, compared this portion of the island fauna with that of other localities in the western basin of the Mediterranean. Other inter-

esting papers may be noted: that of M. Meunier, on the cause of the disappearance of the ancient glaciers; that of M. Emile Belloc, on the reservoir lakes of the Pyrenees; the study of the ancient *massif* of the Barbary coast, with its influence on the structure of the coast ranges of Algeria, by M. Ficheur; the Abbé Radot's observations on the part played by the winds on the plateau of Langres; and the Fauna of the Arabian coasts, by M. Ch. Perez.

A word must be said of the singularly interesting display at Brussels of the paintings, sketches, and water-colours brought from Katanga by the painter Léon Dardenne, who accompanied Capt. Lemaire in his travels in 1898-1900. No such collection, rendering with truthfulness and vigour the aspect of the country and the details of the native life, had been back brought by any previous traveller.

It was in August that a number of geologists, collaborators of M. Michel Lévy, devoted their holiday time to a study of the Mont Dore, one of the most interesting regions of Auvergne, visited in August by the Geologists' Association, under the guidance of Messrs. Glangeaud, Giraud, and Boule.

At another point an accident furnished an opportunity for the decision of a question of local geography. It had frequently been suggested that the source of the Loue (in Franche-Comté), which is remarkably full and powerful, was a subterranean infiltration from the Doubs; but there was no proof of the fact until a fire occurred in an absinthe distillery at Pontarlier and thousands of gallons of the fluid were emptied into the Doubs, colouring the waters with a characteristic milky tint, which made its appearance a few days later in the stream of the Loue.

Many hydrological problems of a similar nature are still waiting solution. One of the most interesting is that of the Trou di Toro, studied without success by M. Emile Belloc, in the region of the headwaters of the Garonne. With regard to that of the Touvre (Charente), M. E.-A. Martel has confirmed by later investigations the explanation given in 1892, and has shown why the volume of this river increases and diminishes without ever running dry.*

In an article in *La Géographie*, for July, M. Martel presents a summary of his season's work in 1900. He finds that for mountain water-courses, as well as for the streams of the plain, the law holds

* The Touvre is supplied by three streams which flow from vast subterranean reservoirs.

good that for the increase of rapidity the volume of water is a factor much more important than the slope.

Worthy of attention, in an earlier number of the same review, is the paper in which M. Ph. Glangeaud, of the University of Clermont-Ferrand, studies, with the help of M. V. Sabatini's work, the history of the volcanoes of Latium (the Alban Mountains), the most important of the extinct volcanic centres in Central Italy, and traces the analogy of some parts of their history with that of the volcanoes of Iceland and of Auvergne.

The French explorers in Africa are extremely active. In Morocco, M. de Ségouzac has made with success a most dangerous expedition to the Rif; and M. Edmond Doutté, in a journey from Casablanca to Marakesh and Rabat, has studied the social and religious life of the people and investigated the relics of the Portuguese domination. At the other extremity of Barbary, M. Méhier de Mathuisieulx travelled, in April and May of this year, in Tripoli—a country hardly more than seen by the illustrious Barth in 1845 and closed against Europeans since that time by the Turks.

Col. Peroz has added to our knowledge of the region between Sorbo-Haussa and Zinder, and much has been done for the geology of the Gabun and the Cristal Mountains by M. Brousseau; while farther north, in the districts of the Campo and the Benito rivers, a reconnoissance by M. Lesieur gives an entirely new aspect to the map of the northern French Congo.

In the southeast, in the bend of the Ogowe and the Ngunie basin, a number of topographical surveys made in 1899–1900, by Lieuts. Rouyer, Gritty, and Avelot, have revealed the existence of the Bumi, an important affluent of the Manjibe, the mouth of which was located by the regretted Dutreuil de Rhins. In the interior, Messrs. Fredon and Cadenat have explored the Bali river, which proves to be the upper Lobaï. An interesting note on this reconnoissance was contributed by M. Fondère to *La Géographie* for August, which contains, also, a very exact report by Capt. Julien, on his journey from Mobaye to Krébedjé in 1899 across the Banghi basin and the Bugbu and Aduma countries. In this way every day adds to the knowledge of the French Congo; and much may be expected in Madagascar from the researches of M. Guillaume Grandidier.

Asia, as well as Africa, has her advocates and her distinguished explorers, and in the front rank of these we must place Prince Henry of Orleans. His crossing of the continent from northwest to southeast with M. Bonvalot, and his itinerary, in company with

Lieut. Roux, from Tonkin to the frontiers of British India, together with his published accounts of these and other journeys, revealed in him one of our best travellers, as well as a sagacious observer, who studied in detail the progress of the French Asiatic colonies, in the future of which he entertained a robust faith. He had just started on a new journey in the Far East when he was struck down by two dangerous complaints. The last of his Indo-Chinese studies is the story of his travels from Kratié to Nha-Trang, across Dar-Lac, a little-known and rarely-visited country, printed in the September number of *La Géographie*, with a sketch map. This paper and Comte Pierre de Barthélemy's reconnaissance of the Moïs Stiengs country complete in many ways the information gathered by the Pavie Mission.

In America a serious economical study of the north of Costa Rica was made in July, 1898–June, 1899, by M. Jules Second, and has been brought to our knowledge by Baron Hulot, who has set forth the results obtained in the districts drained by the San Carlos and the Rio Frio.

The French geodetic mission to Ecuador for the measurement of the arc of the meridian has selected the city of Riobamba for the starting-point of its work, which is directed by Commandant Bourgeois of the geodetic service of the army. Another French mission undertakes a general triangulation of part of the Bolivian plateau, from La Paz and Lake Titicaca to Oruro, to make astronomical observations and a detailed cartographic survey on a scale of 1:50,000. These operations will be conducted by Messrs. Bastide (father and son), Grimaldi, and Vaudry; while M. Dereims will study the geology of the country. In this way there will be made the beginning of a national map of Bolivia—something which neither Chili nor the Argentine Republic can be said to possess.

The detailed reports of some of the congresses held in Paris in 1900, now published, contain precious material for geographers. Foremost among these reports is that of the XXIst Session of the National Congress of the French Geographical Societies, brought out by the *Société de Géographie*. Some of the papers presented—that of M. Flamand, for instance, on the Reliefs and the Depressions of the Sahara—have not been printed; but the volume offers such studies as M. Marcel Dubois' article on the Definition and the Limits of Geography and the Classification of Geographical Sciences, the papers of Gen. Bassot, Commandant Bourgeois, and Col. Berthaut on the Present and Future Work of the *Service Géographique de l'Armée*, M. A.-A. Fauvel's essay in critical bibliography, entitled

New Chinese Cartography, and the note of M. V. Demontès on the Comparative Density of the European and the Native Populations in Algeria. Not less important is the second volume (Notes et Documents) of the 29th Session of the French Association for the Advancement of Science. In this, M. Jean Brunhes treats of the Boulevard as a feature of Town Geography; Messrs. J. Demorlaine and J. Poisson write on the Fixation of Dunes; M. Raulin considers the Observations on Precipitation in the Equatorial Zone (10° N. Lat. to 10° S. Lat.); and there are most instructive notes, such as that of M. F.-G. Dollfus on the Structure of the Paris Basin, that of M. E. A. Martel on the Subterranean Explorations accomplished in 1884-1900, and that of M. A. Leclère on his Geological Exploration in the Chinese Provinces bordering on Tonkin.

In the *Bibliothèque des Sciences Contemporaines*, the volume on Geology, by M. H. Guède, contains much that is valuable to geographers. The whole of the first book is devoted to the external and the internal geodynamics—that is to say, to the modes of manifestation of the modern energy. This very clear and precise résumé will be of great service to those who are beginning the study of physical geography, in spite of the fact that already it needs revision in one of its parts.

Information of the first importance, in fact, is furnished on a capital point of physical geography by the work of M. Charles Rabot on the Variations in Length of Glaciers in the Arctic and Northern Regions, and geologists will have to consider his conclusions, as well concerning the historical record of the variations as on the modes and forms of their manifestation.

M. Georges Blondel makes a contribution to economical literature in his solid volume, *La France et le Marché du Monde*. This opens with a picture of the economical development of the new countries; then goes on to show how the neighbours of France maintain their struggle against foreign competition, and closes by an examination of the question why the French people develop in so slight a degree, with an inquiry into their economical revival.

An excellent volume on the *Puy-de-Dôme et Vichy* belongs to the collection of Guides, begun in 1899, under the charge of M. Marcellin Boule. This, like the preceding volumes of the series, is composed of two parts (1: Monograph of the Department; 2: Itinéraires), and is equally useful and helpful to the tourist, the man of science, and the archæologist. Dr. Delisle, of the Museum of Natural History, has brought out a study of the Montagne Noire et le Col de Naurouze. In this Story of an Error in Geography,

as he calls it, Dr. Delisle shows that the Cevennes do not come to an end, as the geographies declare, with the Montagne Noire at the Col de Naurouze, but that the Montagne Noire forms a *massif*, very clearly bounded on the south by the Fresquel, and on the west by the broad depression of the plain of Revel; beyond this rises a new relief in the hills of Lauraguais, or St. Félix, which separate the plain of Revel from the Pass of Naurouze.

One of the most noteworthy books published on West Africa, since the now classic volume of Capt. Binger, is Capt. d'Ollone's *De la Côte d'Ivoire au Soudan et à la Guinée*, an account of the march of the Hostains-d'Ollone party across the cannibal-haunted dense forest which stretches for a breadth of 350 miles from the Atlantic shore of the Ivory Coast and Liberia to the French Sudan.

The work is in two parts; one relates the events of the journey, the other contains the scientific appendices.

The Congo Free State has recently distributed a remarkable map (on a scale of 1:100,000) of the country between the Atlantic and Stanley Pool, with excellent notices by M. Hubert Droogmans. This fine publication—in fifteen sheets—is the first topographical map of this part of Africa.

In the new volume (continuing the series of works of the Pavie Mission, begun several years since by the Ministry of Public Instruction), M. Pavie tells how he was led, during his sojourn at Kampot, in Cambodia, to interest himself in the natives of eastern Indo-China, and to extend his acquaintance with the unexplored districts of their country. He began by travelling alone (from 1880 to 1885) in Cambodia and Siam, and then continued his explorations to the year 1889, in company with Capt. (now Commandant) Cupet and Capt. Nicolon, through Siam, Laos, Tonkin, and Annam. The present volume, illustrated by engravings and numerous maps, will be followed by a second, containing the work of the Mission for the period 1890–1895, and several volumes of narratives and accounts of travel, one of which (by Capt. Cupet) has already appeared. Though so little progress has been made with this publication (out of 10 volumes only 4 are as yet in print), it may be affirmed that those who find occasion to seek information on the subject of French Indo-China must always have recourse to its pages. By the side of such a work the narratives of Mme. Isabelle Massieu and Count Barthélemy are no more than notes jotted down by tourists, and devoid of scientific observation; while in the works brought out by M. Pavie and Capt. d'Ollone scientific information, instruction, and entertainment go hand in hand.

HENRI FROIDEVAUX.